AMENDMENT

(Amendment based on Order according to Article 11 of Law)

Mr. Commissioner
Japanese Patent Office

1 Indication of International Application: PCT/JP2004/004116

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4 Objects of Amendment: Specification and claims

5 Amendment

(1) Please replace the paragraph, "*According to the first feature of the present invention, there is provided a position-detecting mechanism to detect the position of a subject of measurement. The position-detecting mechanism comprises (i) a light-emitting means to emit a beam of visible light to the subject of measurement and (ii) a regulating means to regulate the beam so that its cross section will be in a certain shape at the place of the subject of measurement*," in lines 5-9 of page 2 by the paragraph, "*According to the first feature of the present invention, there is provided a position-detecting mechanism to detect a side of a subject of measurement. The position-detecting mechanism comprises (i) a light-emitting means to emit a beam of visible light to the subject of measurement and (ii) a regulating means to regulate the beam so that its*

cross section will be in a certain shape at the place of the subject of measurement. The cross-sectional area of the beam at the place of the subject of measurement is such that the change of the shape of the spot lit up by the beam on the subject of measurement is visible when the relative positions of the regulating means and the side of the subject of measurement have changed."

(2) Please replace the sentence, "*Besides, because the beam is regulated so that its cross section will be in a certain shape at the place of the subject of measurement, the operator can judge the position of the subject of measurement just by checking the shape of the spot lit up by the beam on the subject of measurement*," in lines 31-34 of page 2 by the sentence, "*Besides, because the beam is regulated so that its cross section will be in a certain shape at the place of the subject of measurement and the cross-sectional area of the beam at the place of the subject of measurement is such that the change of the shape of the spot lit up by the beam on the subject of measurement is visible, the operator can judge the position of the subject of measurement just by checking the shape of the spot.*"

(3) Please replace the sentence,

"*A position-detecting mechanism to detect the position of a subject of measurement, comprising:*

a light-emitting means to emit a beam of visible light to the subject of measurement; and

a regulating means to regulate the beam so that its cross section will be in a certain shape at the place of the subject of measurement,"

of claim 1 by the sentence,

"*A position-detecting mechanism to detect a side of a subject of measurement, comprising:*

a light-emitting means to emit a beam of visible light to the subject of measurement; and

a regulating means to regulate the beam so that its cross section will be in a certain shape at the place of the subject of measurement,

the cross-sectional area of the beam at the place of the subject of measurement being such that the change of the shape of the spot lit up by the beam on the subject of measurement is visible when the relative positions of the regulating means and the side of the subject of measurement have changed."

6 Attached Documents

(1) Pages 2-3 of Specification

(2) Page 8 of Claims

Means of solving the Problems

According to the first feature of the present invention, there is provided a position-detecting mechanism to detect a side of a subject of measurement. The position-detecting mechanism comprises (i) a light-emitting means to emit a beam of visible light to the subject of measurement and (ii) a regulating means to regulate the beam so that its cross section will be in a certain shape at the place of the subject of measurement. The cross-sectional area of the beam at the place of the subject of measurement is such that the change of the shape of the spot lit up by the beam on the subject of measurement is visible when the relative positions of the regulating means and the side of the subject of measurement have changed.

According to the second feature of the present invention, there is provided the position-detecting mechanism of the first feature. The regulating means of the position-detecting mechanism includes a marker-forming unit to show a marker indicating the position of the reference line of the position-detecting mechanism in the spot lit up by the beam on the subject of measurement.

According to the third feature of the present invention, there is provided the position-detecting mechanism of the first feature. The light-emitting means of the position-detecting mechanism is a light-emitting diode.

According to the fourth feature of the present invention, there is provided a position-detecting sensor, which comprises (i) a transmitting means to transmit a signal to a subject of measurement, (ii) a receiving means to receive the signal, and (iii) the position-detecting mechanism of the first, second, or third feature and detects the position of the subject of measurement based on the signal received by the receiving means.

According to the fifth feature of the present invention, there is provided the position-detecting sensor of the fourth feature. The transmitting means of the position-detecting sensor serves concurrently as the position-detecting mechanism.

Effects of the Invention

The advantages offered by the first feature of the present invention are as follows. Because the light-emitting means emits a beam of visible light, the spot lit up by the beam on the subject of measurement is visible to the operator. Accordingly, the operator can judge the position of the subject of measurement by the position of the spot on the subject of measurement. Besides, because the beam is regulated so that its cross section will be in a certain shape at the place of the subject of measurement and the cross-sectional area of the beam at the place of the subject of measurement is such that the change of the shape of the spot lit up by the beam on the subject of measurement is visible, the operator can judge the position of the subject of measurement just by checking the shape of the spot. Thus, the operator can easily judge the position of a subject of measurement by using his eyes alone without using a scale. The operator can easily, safely judge the position of a subject of measurement even while it is running on its production line. If the position-detecting mechanism

is incorporated into a position-detecting sensor, the operator can judge the deviation of a subject of measurement from the reference line of the position-detecting sensor by using his eyes alone. Therefore, the position-detecting sensor can be calibrated easily, accurately.

The advantage offered by the second feature of the present invention is as follows. With the position-detecting mechanism, the operator can judge the relative positions of the reference line of the position-detecting mechanism and a subject of measurement.

The advantage offered by the third feature of the present invention is as follows. Because the light-emitting means is a light-emitting diode, it consumes a small amount of electric power and its service life is long. Thus, its maintenance and running costs are low.

The advantage offered by the fourth feature of the present invention is as follows. Because the operator can judge the relative positions of the reference line of the position-detecting sensor and a subject of measurement, he can easily, accurately calibrate the position-detecting sensor.

The advantage offered by the fifth feature of the present invention is as follows. Because the transmitting means serves as the position-detecting mechanism, it is not necessary to provide the position-detecting mechanism in addition to the transmitting means. Thus, the structure of the position-detecting sensor can be simple and the position-detecting sensor itself can be compact.

Claims

1. A position-detecting mechanism to detect a side of a subject of measurement, comprising:

a light-emitting means to emit a beam of visible light to the subject of measurement; and

a regulating means to regulate the beam so that its cross section will be in a certain shape at the place of the subject of measurement,

the cross-sectional area of the beam at the place of the subject of measurement being such that the change of the shape of the spot lit up by the beam on the subject of measurement is visible when the relative positions of the regulating means and the side of the subject of measurement have changed.

2. The position-detecting mechanism according to claim 1, wherein the regulating means includes a marker-forming unit to show a marker indicating the position of the reference line of the position-detecting mechanism in the spot lit up by the beam on the subject of measurement.

3. The position-detecting mechanism according to claim 1, wherein the light-emitting means is a light-emitting diode.

4. A position-detecting sensor which comprises (i) a transmitting means to transmit a signal to a subject of measurement, (ii) a receiving means to receive the signal, and (iii) the position-detecting mechanism of claim 1, 2, or 3 and detects the position of the subject of measurement based on the signal received by the receiving means.

5. The position-detecting sensor according to claim 4, wherein the transmitting means serves concurrently as the position-detecting mechanism.